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TELECOMMUNICATIONS® TIA INDUSTRY ASSOCIATION

September 25, 1998

RECEIVED
SEP 28 1998
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Secretary, Federal Communications Commission
Room 222
1919 M Street NW
Washington, D.C. 20554

Re: Ex Parte, In the Matter of Petition to Amend Part 68 of the Commission's rules to Include Terminal Equipment Connected to Basic Rate Access Service Provided via Integrated Services Digital Network Access Technology and In the Matter of Petition to Amend Part 68 of the Commission's Rules to Include Terminal Equipment Connected to Public Switched Digital Services, CC Docket No 93-268, RM 7815, RM 6147

Dear Ms. Salas:

This is to confirm that on September 25, 1998, the Telecommunications Industry Association (TIA) participated in a meeting with Commission staff attorney Vincent Paladini, Commission staff engineer Debra Harper, Commission staff engineer William Howden, and Deputy Chief Blaise Scinto, Network Services Division, Common Carrier Bureau, to discuss signal distortion and minimum performance criteria for the volume control as addressed in the technical standards EIA-504, *Magnetic Field Intensity Criteria for Telephone Compatibility with Hearing Aids*, and ANSI/TIA/EIA-504-A-1998, *Magnetic Field Intensity Criteria for Telephone Compatibility with Hearing Aids*.

Participating in the exchanges, in addition to Vincent Paladini, Debra Harper, William Howden, and Blaise Scinto, were Steve Whitesell of Philips Consumer Communication, Charles Berestecky of Lucent Technologies, Pierre Adornato of Nortel, and Roberta E. Breden, TIA staff, on behalf of TIA.

The attached eleven pages and a copy of each of the previously referenced technical standards were provided in connection with the meeting.

Thank you.

Sincerely,

Roberta E. Breden

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Representing the telecommunications industry in association with the Electronic Industries Association

Comparison of

ANSI/TIA/EIA-504-A-1997

to

EIA RS-504
(as Incorporated into Part 68 of the FCC Rules)

by

Stephen R Whitesell
Chair, TIA Subcommittee TR-41.3
Analog and Digital Wireline Terminals

Document References

ANSI/TIA/EIA-504-A-1997 (Approved December 4, 1997)
Telecommunications - Telephone Terminal Equipment - Magnet Field and Acoustic Gain Requirements for Handset Telephones Intended for Use by the Hard of Hearing

EIA RS-504 (Approved November, 1983)
Magnetic Field Intensity Criteria for Telephone Compatibility with Hearing Aids

Note 1: EIA RS-504 was adopted verbatim into 47 CFR 68.316 as the technical requirements for Hearing Aid Compatibility pursuant to an FCC order dated January 11, 1984 in Docket 83-427

Note 2: ANSI/TIA/EIA-504-A-1997 provides some discussion of the differences between the two documents in its Annex A

Major Differences

- New test procedure as regards definition of input level
- Corresponding change in specification of required output level
- Magnetic field strength requirement applies at nominal volume control setting
- Different method of specifying frequency response characteristic
- Eliminates relaxed frequency response requirement for higher magnetic field strengths
- Includes receive volume control requirements for acoustic output
- Applicable to all types of telephones (analog and digital, including ISDN)

Not Changed

- Test positions and characteristics specified
  - Axial magnetic field strength
  - Radial field strength at four positions 90º apart
  - Axial frequency response relative to 1000 Hz level
- Probe coil specified for magnetic field measurements
- Magnetic field provided for hearing aid coupling in real world situations

EIA RS-504 Test Method

- Applies only to analog telephones
- Input signal specified in terms of signal voltage applied to test circuit that powers telephone
- High input signal level for ease of testing
- Somewhat unconventional test circuit
    - No loss in path for test signal equivalent to being on very short telephone line
    - DC current provided to power telephone equivalent to being on long telephone line
- Combination of high applied signal level and unconventional test circuit provides magnetic field strength (and receive acoustic output) about 14 dB higher than experienced during average telephone conversation
- Frequency response measured in terms of open circuit voltage across terminals of probe coil relative to level at 1000 Hz

TIA/EIA 504-A Test Method

- Applies equally well to analog and digital telephones
- Input signal level adjusted to provide specified acoustic output level from receiver
- Magnetic field strength measured using the input signal level thus determined
- Does not require explicit definition of test circuit used for powering telephone and applying test signal
- Specified acoustic output level for receiver and, therefore, measured magnetic field strength typical of level experienced during average telephone conversation
- Frequency response measured in terms of magnetic field strength relative to level at 1000 Hz

Differences in Output Level Specification

- **EIA RS-504 test procedures produce magnetic field strength about 14 dB higher than level experienced during average telephone conversation**
- **TIA/EIA 504-A test procedures produce measured magnetic field strength typical of level experienced during average telephone conversation**
- **Therefore, the magnetic field strength specification in TIA/EIA 504-A must be 14 dB lower than in EIA RS-504 to produce same magnetic field for hearing aid coupling in real world situations**

Comparison of Magnetic Field Strength Requirements

Parameter	EIA RS-504	TIA/EIA 504-A	Difference
Axial Field Strength	-22 dB re 1 A/m Minimum	-36 dB re 1 A/m Minimum	14 dB
Radial Field Strength	-27 dB re 1 A/m Minimum	-41 dB re 1 A/m Minimum	14 dB

Comparison of Measured Axial Magnetic Field Strengths

Telephone	EIA RS-504	TIA/EIA 504-A	Difference
500 Set	-13.0 dB re 1 A/m	-27.9 dB re 1 A/m	14.9 dB
Set A	-13.0 dB re 1 A/m	-28.2 dB re 1 A/m	15.2 dB
Set B	-18.9 dB re 1 A/m	-34.2 dB re 1 A/m	15.3 dB

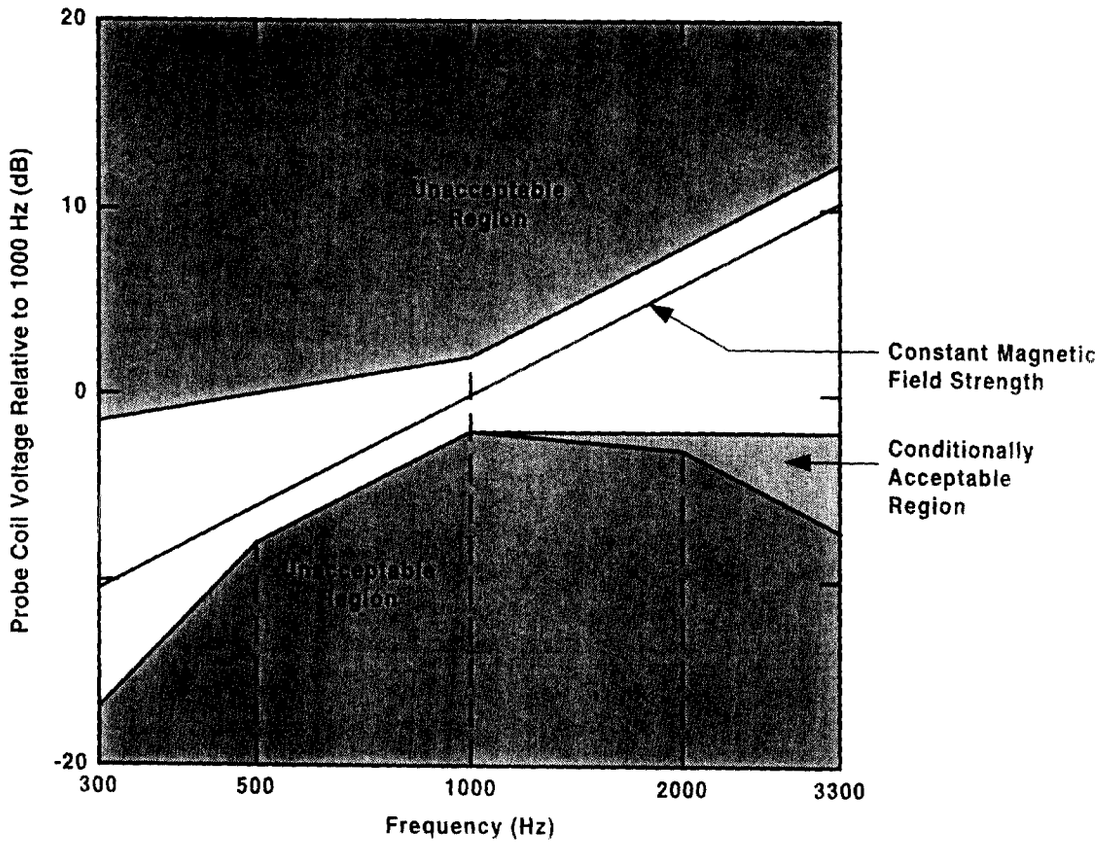
(for sets having nominal receive levels)

Differences in Frequency Response Specification

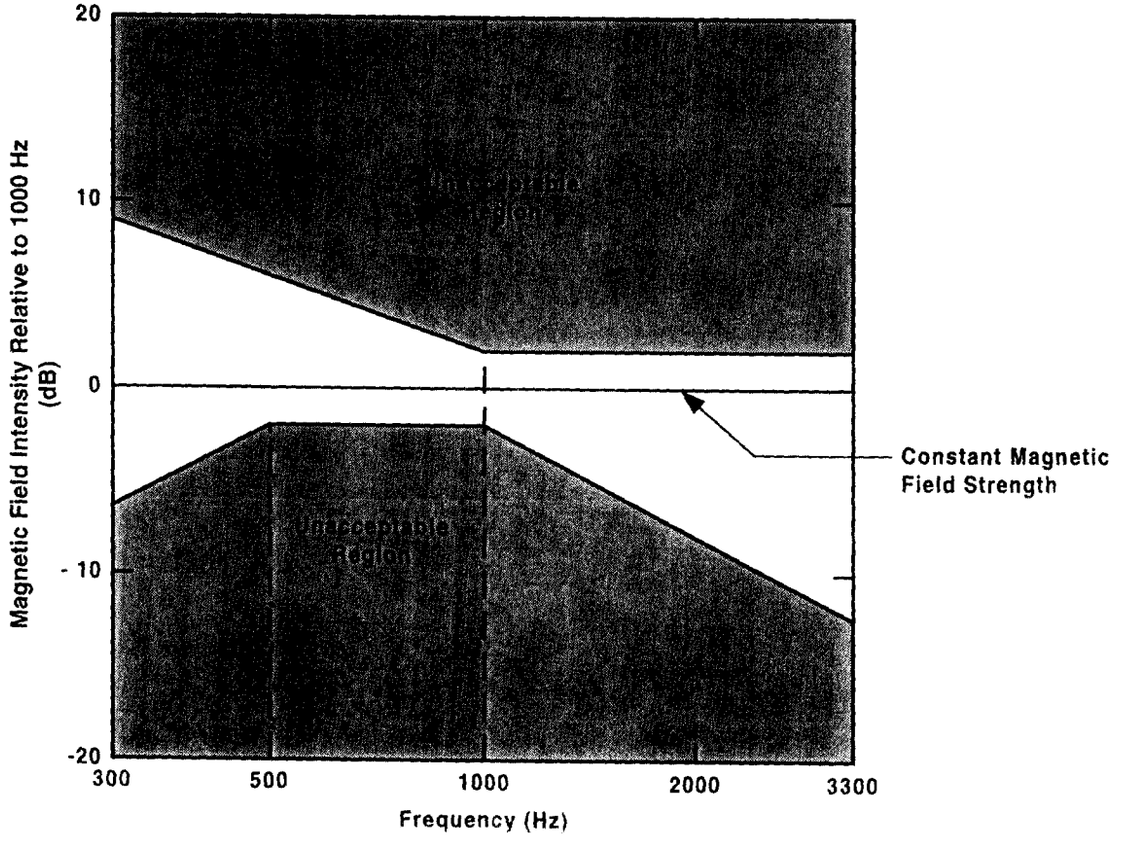
- EIA RS-504 frequency response specified in terms of open circuit voltage measured across output terminals of probe coil
- TIA/EIA 504-A frequency response specified in terms of actual magnetic field strength produced
- Open circuit voltage of probe coil increases in proportion to frequency when subjected to constant magnetic field strength (i.e., doubling frequency doubles open circuit voltage)
- When plotted on a dB vs log frequency graph, constant magnetic field strength produces
    - Flat (level) frequency response measured per TIA/EIA 504-A
    - Rising (6 dB/octave) frequency response measured per EIA RS-504
- Thus, frequency response template in TIA/EIA 504-A must be "tilted" downward by 6 dB/octave relative to template in EIA RS-504
- Two EIA RS-504 frequency response templates provide relaxed requirement (lower limit widened above 1000 Hz) for axial magnetic field strength at 1000 Hz 3 dB or more above minimum
- Single TIA/EIA 504-A frequency response template corresponds to more stringent EIA RS-504 template

  Note: Wrong template erroneously included in TIA/EIA 504-A being corrected by publisher

EIA RS-504



TIA/EIA 504-A



Receive Volume Control Requirements

- Receive acoustic output must meet requirements in applicable telephone set standard (TIA/EIA 470-B for analog telephones, TIA/EIA 579-A for digital and ISDN telephones) with receive volume control set to nominal
- Nominal setting assumed to be minimum setting unless specified otherwise by manufacturer
- Must provide between 12 and 18 dB gain (measured in terms of Receive Objective Loudness Rating - ROLR) at maximum volume control setting relative to nominal
- 18 dB limit may be exceeded if going on-hook (hanging up) restores gain to nominal
- Includes 10% total harmonic distortion requirement at maximum volume control setting
- 12 to 18 dB gain and 10% distortion requirements also applied to magnetic field strength

Overall Net Effect of Adopting TIA/EIA 504-A

- Magnetic field strength numbers appear lower, but real world magnetic field strength is same except
- "Loop hole" for meeting magnetic field strength requirement by increasing gain level eliminated
- Frequency response requirements appear different, but are same except
- Relaxation of limits for higher magnetic field strengths eliminated
- Includes same receive volume control requirements for acoustic output as in present Part 68 rules
- Applies receive volume control gain requirements to magnetic field strength as well as acoustic output
- Adds distortion requirement for both acoustic and magnetic output at maximum volume control setting
- Applicable to all types of telephones